Claims

[Claim 1]

A combustion furnace that combusts matter to be combusted while transferring the matter to be combusted along a transfer direction, the combustion furnace comprising:

a combustion furnace main body configured to combust the matter to be combusted;

a matter-to-be-combusted feeding unit configured to feed the matter to be combusted to the combustion furnace main body;

a transfer unit installed in the combustion furnace main body and configured to transfer, in the transfer direction, the matter to be combusted fed to the combustion furnace main body by the matter-to-be-combusted feeding unit;

an air supply unit configured to supply combustion air to the combustion furnace main body;

a detecting unit configured to detect a distribution state of the matter to be combusted that is uncombusted in the transfer direction, the matter to be combusted that is uncombusted being transferred by the transfer unit; and

a control unit configured to control the air supply unit based on the distribution state detected by the detecting unit such that a larger amount of the combustion air is supplied to a first predetermined region than to other regions, the first predetermined region being a region where a larger amount of the matter to be combusted that is uncombusted is present in the transfer direction than in the other regions, wherein

the air supply unit includes:

an upstream-side air supply port disposed above the transfer unit and configured to supply the combustion air from an upstream side toward a downstream side in the transfer direction; and

a downstream-side air supply port disposed above the transfer unit and configured to supply the combustion air from the downstream side toward the upstream side in the transfer direction,

the upstream-side air supply port is disposed more upstream than the downstream-side air supply port in the transfer direction such that the upstream-side air supply port faces the downstream-side air supply port, and

the control unit controls the air supply unit such that, in a case where the first predetermined region is present at a position closer to the downstream-side air supply port than to the upstream-side air supply port in the transfer direction, a first flow rate of the combustion air supplied from the upstream-side air supply port is greater than a second flow rate of the combustion air supplied from the downstream-side air supply port.

[Claim 2]

The combustion furnace according to claim 1, wherein

the control unit controls the air supply unit such that, in a case where the first predetermined region is present at a position closer to the upstream-side air supply port than to the downstream-side air supply port in the transfer direction, a first flow rate of the combustion air supplied from the downstream-side air supply port is greater than a second flow rate of the combustion air supplied from the upstream-side air supply port.

[Claim 3]

The combustion furnace according to claim 1 or 2, wherein

the detecting unit detects the distribution state based on an image of the matter to be combusted captured from above the transfer unit.

[Claim 4]

The combustion furnace according to claim 1 or 2, wherein

the detecting unit detects the distribution state based on a temperature distribution in the transfer direction.

[Claim 5]

The combustion furnace according to any one of claims 1 to 4, wherein

the detecting unit detects the distribution state of the matter to be combusted that is uncombusted in a width direction orthogonal to the transfer direction, and

the control unit controls the air supply unit based on the distribution state in the width direction detected by the detecting unit such that a larger amount of the combustion air is supplied to a second predetermined region than to other regions, the second predetermined region being a region where a larger amount of the matter to be combusted that is uncombusted is present in the width direction than in the other regions.

[Claim 6]

The combustion furnace according to any one of claims 1 to 5, wherein

the air supply unit includes a plurality of primary air supply ports configured to supply the combustion air from below the transfer unit toward the matter to be combusted transferred by the transfer unit,

the plurality of primary air supply ports are disposed along the transfer direction, and

the control unit controls the air supply unit such that a first flow rate of the combustion air supplied from a primary air supply port of the plurality of primary air supply ports that is disposed at a position close to the first predetermined region is greater than a second flow rate of the combustion air supplied from a primary air supply port of the plurality of primary air supply ports that is disposed at a position close to the other regions.

[Claim 7]

A method for controlling a combustion furnace that combusts matter to be combusted while transferring the matter to be combusted along a transfer direction, the combustion furnace including:

a combustion furnace main body configured to combust the matter to be combusted;

a matter-to-be-combusted feeding unit configured to feed the matter to be combusted to the combustion furnace main body;

a transfer unit installed in the combustion furnace main body and configured to transfer, in the transfer direction, the matter to be combusted fed to the combustion furnace main body by the matter-to-be-combusted feeding 40 unit; and

an air supply unit configured to supply combustion air to the combustion furnace main body,

the air supply unit including:

an upstream-side air supply port disposed above the transfer unit and configured to supply the combustion air from an upstream side toward a downstream side in the transfer direction; and

a downstream-side air supply port disposed above the transfer unit and configured to supply the combustion air from the downstream side toward the upstream side in the transfer direction, the upstream-side air supply port being disposed more upstream than the downstream-side air supply port in the transfer direction such that the upstream-side air supply port faces the downstream-side air supply port,

the method comprising:

a detecting step of detecting a distribution state of the matter to be combusted that is uncombusted in the transfer direction, the matter to be combusted that is uncombusted being transferred by the transfer unit; and

a control step of controlling the air supply unit based on the distribution state detected in the detecting step such that a larger amount of the combustion air is supplied to a first predetermined region than to other regions, the first predetermined region being a region where a larger amount of the matter to be combusted that is uncombusted is present in the transfer direction than in the other regions, wherein

the control step includes controlling the air supply unit such that, in a case where the first predetermined region is present at a position closer to the downstream-side air supply port than to the upstream-side air supply port in the transfer direction, a first flow rate of the combustion air supplied from the upstream-side air supply port is greater than a second flow rate of the combustion air supplied from the downstream-side air supply port.

[Claim 8]

The method for controlling the combustion furnace according to claim 7, wherein

the control step includes controlling the air supply unit such that in a case where the first predetermined region is present at a position closer to the upstream-side air supply port than to the downstream-side air supply port in the transfer direction, a first flow rate of the combustion air supplied from the downstream-side air supply port is greater

than a second flow rate of the combustion air supplied from the upstream-side air supply port.

[Claim 9]

The method for controlling the combustion furnace according to claim 7 or 8, wherein the detecting step includes detecting the distribution state based on an image of the matter to be combusted captured from above the transfer unit.

[Claim 10]

The method for controlling the combustion furnace according to claim 7 or 8, wherein the detecting step includes detecting a temperature distribution in the transfer direction as the distribution state.

[Claim 11]

The method for controlling the combustion furnace according to any one of claims 7 to 10, wherein the detecting step includes detecting the distribution state of the matter to be combusted that is uncombusted in a width direction orthogonal to the transfer direction, and the control step includes controlling the air supply unit based on the distribution state in the width direction detected in the detecting step such that a larger amount of the combustion air is supplied to a second predetermined region than to other regions, the second predetermined region being a region where a larger amount of the matter to be combusted that is uncombusted is present in the width direction than in the other regions.

[Claim 12]

The method for controlling the combustion furnace according to any one of claims 7 to 11, wherein

the air supply unit includes a plurality of primary air supply ports configured to supply the combustion air from below the transfer unit toward the matter to be combusted transferred by the transfer unit,

the plurality of primary air supply ports are disposed along the transfer direction, and

the control step includes controlling the air supply unit such that a first flow rate of the combustion air supplied from a primary air supply port of the plurality of primary air supply ports that is disposed at a position close to the first predetermined region is greater than a second flow rate of the combustion air supplied from a primary air supply port of the plurality of primary air supply ports that is disposed at a position close to the other regions.